THE UNIVERSITY OF ALBERTA

EFFECT OF AGE AT TIME OF ENTRANCE INTO GRADE I ON SUBSEQUENT ACHIEVEMENT

A DISSERTATION

SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE

DEGREE OF MASTER OF EDUCATION

FACULTY OF EDUCATION

BY

WILBERT GEORGE BEVINGTON

EDMONTON, ALBERTA

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SYNOPSIS

This investigation was undertaken in an effort to determine the effect of chronological and mental age at the time of entrance into grade I upon subsequent achievement of pupils in the Edmonton Elementary Public School System.

The data for this study, which were obtained from the cumulative records of six hundred and forty pupils who had completed the first six grades in the Edmonton Public School System, included: date of birth, date of beginning school, intelligence scores, attendance record, grade scores of seven standardized achievement tests, grade VI final marks, record of promotions or non-promotions and the ratings given at the end of each of the six years for six personality traits. For comparative purposes the pupils considered were arranged, according to age at time of entrance, in five chronological age groups and three mental age sections.

By computing the means of the grade scores for the seven standardized achievement tests, it was found that there was no significant difference between the scores obtained by pupils of different

chronological ages. However, there was a significant difference between the scores obtained by pupils of different mental ages.

The younger entrants received the same averages for the final grade VI marks as the older entrants. When pupil progress was considered by comparing the failures, recommendations, honor standings and accelerations, it was found that the older pupils had a slight advantage. The mental age of pupils at time of entrance seems to be the determining factor in subsequent achievement.

There was found to be very little difference in regularity of attendance between the different age groups.

The younger entrants received as high ratings on the six personality traits as the older entrants. The pupils who failed one or more years received substantially lower ratings for the personality traits than pupils making normal progress. All pupils were given higher personality ratings at the grade VI level than at the grade I level.

Evidence from the study points out that a combination of chronological age and mental age requirements in the entrance regulation is a sound policy.

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CHAPTER I

THE PROBLEM

At what age should children enter school?

"There is popular acceptance of the notion that age six is the time when children should enroll in the first grade. How this happened to come about is not clearly understood. Perhaps the practice evolved because six-year-old children were mature enough to leave home and to travel the necessary distance to school."[1] Undoubtedly this fact has influenced legislation with respect to entrance age in the past. Today, there are many influences within the community, such as the increased number of kindergartens, play schools, radio programs and television, which all help to provide children with valuable experience and background which should make it possible for them to enter school at a younger age than children of a few generations ago. Russell,[2] points out that the lowering of age for admission to the first grade to five and one-half years is common, a contrast to two or three generations ago, when children were often seven or eight years of age when they entered school.

Educators and parents have been concerned about the advisability of the lowering of the admission age.

Research in the field of educational psychology has brought about new understandings of the rate of intellectual, physical and social development of children. As a result of this new knowledge efforts have been made to correlate the curriculum and methods of instruction with these differing rates of development. These modifications have made it possible for educators and school administrators to change the entrance policies from time to time.

Before 1925 the Edmonton Public School System allowed only those children who were six or more by September 1 to enter school. Since this date six changes in the entrance requirements have been made resulting in the present regulations which state: all children who are six years old before the first of September may enter on opening day. All other children whose sixth birthday comes on or before the last day of the following February may also enter provided they have a mental age of 5-9.[3]

Many parents of prospective beginners become dissatisfied with the mental age requirement of the entrance regulation when their child has been excluded. Every fall fifteen to twenty parents who have had children excluded appeal to the Assistant Superintendent of Edmonton Elementary Public Schools to have their children admitted to grade I. There are doubtless many more complaints made to principals and teachers. In 1953

Bayly[4] in a survey of the effect of the present entrance regulations found that 267 of the children under six years of age at time of entrance were excluded.

Other evidence of concern regarding entrance age was shown in 1953 when the University Women's Club[5] requested the Edmonton Public School Board to discontinue using the mental age requirement and allow children to begin school in September whose sixth birthday came before the following December 31. They contended that children who entered school in September and did not become six years of age until the following January or February were too young to make normal progress. The immaturity of these younger entrants caused many failures in grade I or II. It was argued that repeaters were placing an unnecessary burden on the already overcrowded classrooms and adding to the rising costs of education since more teachers would be needed. Valuable teaching time was being sacrificed in an effort to teach pupils who were not ready to begin school. It was also pointed out that faced with situations with which they are unable to cope, children often become frustrated or disinterested and tend to develop undesirable behavior habits.

The Edmonton Public School Board at a meeting held in June, 1953, passed a resolution[6] adopting the suggested

changes in the entrance regulations. However, the Edmonton Elementary Teachers' Association along with a number of other interested educators protested. They felt that the discontinuance of the mental age requirement would allow many mentally immature children to enter school, of whom a number would have to repeat grade I. This would only add to the overcrowded condition of classrooms. They also contended that many of the brighter children whose sixth birthday did not come until January or February were able to make normal progress in school and should not be denied the opportunity of starting school a year sooner. Failure to permit these younger and brighter children to enter school would only add to the number entering the following year, thus no permanent relief from overcrowding would be gained. The School Board rescinded the resolution[7] in January 1954.

Because of the above mentioned controversy and a professional need for more information with respect to entrance age, this study was undertaken.

The Purpose of the Study

The main purpose of this study was to determine the effect of age at time of entrance into grade I upon the subsequent achievement of pupils in the Edmonton Public Schools. More specifically the purpose was to determine what effect chronological and mental age at time of

entrance had on subsequent achievement and pupil progress in the elementary school by comparing:

1. The standardized achievement test scores; grade six final marks; attendance record; and intelligence test scores of groups of pupils who were under six years of age at time of entrance, with groups who were over six years of age at time of entrance.
2. The number of retardations, recommendations (conditional promotions), honor standings, and accelerations of the younger entrants with older entrants.
3. The social development of the younger entrants with the older entrants as evaluated by ratings given by teachers on six personality traits.

Limitations of the Study

Since there are a number of factors contributing to the success or failure of pupils at any grade level, it was necessary to define the limits of this study. No attempt was made to:

1. Compare the effects of entrance policy of the Edmonton Public School System with other school systems. It was not a study of entrance policy, but rather a comparison of the achievement of pupils in the elementary schools who had entered school in accordance with the present regulations.

2. Assess the methods used to determine promotion or non promotion policies or practices.
3. Deal with the validity or reliability of the tests or methods used in determining achievement, progress, or social development of pupils in the Edmonton Public School System.
4. Determine at what chronological age or mental age children should be allowed to begin school.

CHAPTER II

REVIEW OF THE LITERATURE

Limitations of the Review

In reviewing the literature pertaining to this subject, it was found that very few writers have dealt directly with the effect of age at time of entrance upon subsequent achievement. There are, however, numerous studies dealing with age in relationship to grade placement, promotional practices, and the introduction of the different aspects of such subjects as reading and arithmetic. Therefore, in attempting to stay within the limits of the topic only material pertaining to the following three areas has been presented:

1. Effect of chronological age at time of entrance on achievement,
2. Effect of mental age at time of entrance on achievement,
3. Effect of a combination of chronological age and mental age at time of entrance on school achievement.

1. Effect of Chronological Age at Time of Entrance on Achievement.

A survey made in 1952 by the Cleveland Bureau of Educational Research[8] on admission age and promotion policy in a hundred of the largest cities of the country revealed

that the average minimum age for entrance into the first grade, in schools on an annual promotion basis, was five years nine months. The average age of entering first graders was found to be about six years, three months. In contrast, this survey points out that in 1918 the mean chronological age of grade I pupils was six years eleven months at time of entrance.

Otto[9] suggests several proposals for avoiding financial losses incurred and personal harm to pupils by non-promotion. Among these is the suggestion for a revision of the basis upon which pupils are admitted to the first grade. He suggests that if capacity to do school work as manifested by mental age should become the criterion for admission to the first grade, a much larger proportion of pupil success than now prevails would be assured. "If the grade placement of curriculum content for the first grade is to be considered so thoroughly and scientifically established that its present most commonly found status cannot be altered, then entrance on the basis of mental age is no doubt to be preferred. But where there are no kindergartens a large number of children would not be able to enter school until they are seven, eight or nine years old. Hence it seems that the only defensible policy is to admit on the basis of chronological age and to provide

such flexibility in organization, curriculum and teaching procedures that the educational needs of the various types of first grade pupils will be cared for adequately."[10]

In order to determine the basis upon which children were admitted to grade I, Otto[11], gathered data from 600 superintendents in his area. The following criteria and frequency of use were found.

Chronological age	201
Teacher's judgment	159
Mental age	94
Test scores	86
Physical maturity	57
Social maturity	56
Achievement in kindergarten	52
Reading readiness	25

In a study made by the Assistant Superintendent of Elementary Education for the Edmonton Public Schools,[12] at the request of the School Board, the following information on entrance age in representative systems was compiled.

Policy in Representative Centres

System	Chronological Age Limits	Special Provisions	Mental Testings
Calgary Public	Jan. 31	Jan., Feb. births must be above D Category on Detroit Test.	Yes
Toronto Public	Dec. 31	Most eligible after one years attendance in kindergarten	No mention
Vancouver Public	Dec. 31	None indicated	No mention

System	Chronological Age Limits	Special Provisions	Mental Testings
Winnipeg Public	Nov. 30	Individual tests given to immature pupils where needed. Usually start in kindergarten (See Code).	No
Edmonton Public	Feb. 28	All underage subject to testing. Exclude those with M.A. under 5.9	Yes
Edmonton Separate	Feb. 28	Same as Edmonton Public	Yes
Spokane Public	Sept. 30	No underage pupils beyond September 30 considered	No mention
Seattle	a. Oct. 30	For those without kindergarten experience	
	b. Dec. 31	For those with one year's kindergarten experience	No mention
		Doubtful cases subject to check by Guidance Department	
Clover Bar	Sept. 1	All under age between Sept. 1 to Dec. 31 subject to testing. Exclude those with a M.A. under 6.0	Yes

A study recently published in the New Jersey Educational Review[13] concludes definitely that a child is fortunate not to enroll in school too early. A child born just too late to enter school this year is "just lucky enough to miss an unhappy school experience and gain

a happy one," according to the director of this study, H. M. Davis, supervising principal at River Edge, New Jersey. To insist that a four-year-old enter school and compete with five year olds, Principal Davis pointed out, is as unfair as to insist that a sixteen-year-old boy fight with twenty-year-old men.

There seems to be a great variation in the results of research studies on this problem. Cron and Koontz,[14] oppose increasing the minimum age of entrance in Kansas to six years by September 1, for grade I. On the basis of studies made in the Wichita schools, they conclude that a few months difference in age is a poor index for determining maturity and readiness. They find no evidence that children who enter below six suffer in achievement in comparison with their older companions either in grade I or in later grades.

In Arkansas, an elementary school council has been studying current practices and research findings with regard to entrance age. The council concluded that "a child should be at least six years old before, or very soon after, entering the first grade".[15] This conclusion seems to be sustained by King[16] who conducted a study in Oak Ridge, Tennessee, to determine the possible effect that chronological age at the time of entrance to grade I has on the achievement of pupils throughout the first six years of school. She chose a group of pupils having an I.Q. range from 90 to 110 and, for purposes of comparison,

divided them into two groups; children in the younger group were all under six years of age at time of entrance to grade I, and those in the older group were all over six years of age at time of entrance to grade I.

With groups of children such as were included in the Oak Ridge[17] study it was indicated that the following results may be expected.

1. Younger entrants will have difficulty in achieving the same grade level standard in academic skills and many may fall far below the grade level standards of the older group.
2. A larger percentage of the younger entrants will have to repeat a grade.
3. The average daily attendance will be higher among the older group which may indicate that the younger entrants are not physically strong enough to stand the strain of school.
4. The younger entrants seem to show more indications of poor social and personal adjustment in school.
5. A few additional months of chronological age at the beginning of grade I will substantially help a child to meet the imposed restrictions and tensions that a school necessarily presents.

2. Effect of Mental Age at Time of Entrance on Achievement.

The policy with respect to age of entrance into grade I has in the past few years been influenced considerably by what authorities in the field of reading believe to be the most suitable mental age to begin the teaching of reading. Since the promotion from grade I depends largely upon the ability of the child to meet the reading requirements of grade I, it would then follow that the entrance requirements into grade I should be based upon the most suitable mental age at which to start the teaching of reading. However, not all authorities in the field of reading are in agreement as to what is the most suitable mental age to start teaching children to read as there are other factors involved, such as physical, emotional and social maturity. Most authorities would agree that children who have a mental age of six years when entering school will be able to successfully complete the grade I program. Harris,[18] states that there is a substantial relationship between mental age and ease of learning to read. Most children who fail in reading in the first grade have mental ages below six years. The more mature not only learn more easily but also retain what they learn better than the less mature children. Many studies have been made to determine at what mental age children are ready to be taught the different aspects of reading,

language and arithmetic. However, most entrance regulations require a certain chronological age and do not specify that a child must have attained a certain mental age before entering school. Therefore, in order to help these younger immature entrants, many systems are providing readiness programs. "In one study of such provisions in California schools it was found that 43 per cent of the school systems replying to a questionnaire, had in addition to readiness programs in regular first grades, special classes stressing readiness activities."[19]

Otto[20] found, when the superintendents in his area were asked to state the criteria for promotion from grade I to grade II, that 277 of the 536 put reading readiness at the top of the list. Anderson[21] would agree with this position for he believes that a child's progress in the primary grades is measured by his success in reading. Many other educationalists would agree that success in the first grade depends upon the child's ability to learn to read.

Then the problem arises as to how to predict whether or not a child has abilities necessary to learn to read. Morphett and Washburne[22] find that there is a correlation ranging from .50 to .65 between mental age and ability to learn to read. They also found a higher correlation between mental age and reading progress when

the mental age was measured by the Detroit Beginning First-Grade Intelligence Test than when mental age was measured by the Stanford Revision of the Simon-Binet Scale. Their study[23] also indicated that mental age alone shows a larger degree of correlation with reading progress than did the intelligence quotient or average of mental and chronological ages. When the Detroit test was used as a basis for determining mental-age groups the children who had mental-ages of six years and six months made far better progress than did the less mature children. They concluded that "it seems safe to state, that by postponing the teaching of reading until children reach a mental level of six and a half years teachers can greatly decrease the chances of failure and discouragement and correspondingly increase the efficiency of teaching."[24]

Russell[25] points out that any statement which indicates that a mental age of 6.5 must be attained before success in beginning reading can be gained, should be interpreted with caution. However, he does maintain that given only an average teacher with average equipment and an ordinary type of school program, there is some indication that mental ability of approximately 6.5 is needed if a child is to achieve success in reading. Gates[26]

points out that the important thing is probably not the mental test score of the child but the type of educational program in which the child is participating. The program, not the mental test score, is the determining factor in a child's success in reading. Keister[27] has reported on the progress of three first-grade classes in which most of the children were five years old. Reading ability at the end of the year was practically up to norm on the standardized tests. However, when the children entered the second grade the following September they had forgotten so much that the teachers practically had to start all over again; by the end of the second grade they were still well below the norm.

Grossnickle[28] believes that any plan of teaching number processes that is organized on an age-grade basis is clearly outmoded. The activities engaged in by any group of pupils should be determined by the objectives of the school, the nature of the children, their purposes, interests, needs, and mental abilities. In general, Grossnickle[29] would only introduce number concepts when there is a felt need by the pupil and when the pupil has the mental ability to master the work with a minimum of strain and tension. In his table[30] of recommended steps for introducing arithmetic processes, the lowest mental age is six years. Therefore, it may be assumed that he

believes arithmetic processes cannot be taught profitably until the child has reached a mental age of at least six years.

There seems to be very little evidence in the literature on the subject of entrance age to indicate that a chronological age entrance requirement is an adequate criterion on which to base entrance to grade I. On the other hand there is no conclusive evidence that a set mental age should be the sole criterion.

3. The Effect of A Combination of Chronological Age and Mental Age on Achievement.

Handy[31] conducted a study in an effort to determine whether or not underage children are successful in the schools of Plymouth, Massachusetts, where the grade I entrance requirement was a combination of mental age and chronological age. In September, children were admitted whose 6th birthday occurred before the following January 1st, regardless of mental age. Those whose birthdays came between January 1st and September 1st of the following school year were given a mental test by psychiatrists. If these underage children obtained a mental age of five years eight months they were allowed to start but if any child in this group showed evidence of immaturity he was requested to withdraw.

The underage pupils were compared with regular age pupils over a period of twelve years. The marks

obtained at the end of each grade were converted to A, B, and C ratings and these ratings along with the percentage of failures were used as the basis for comparisons of the two groups. From the extensive mass of data compiled the following conclusions were obtained:

1. The percentage of failures was markedly less in the underage group.
2. The percentage of C's obtained was much less for the underage group. The percentage of A's and B's combined was slightly more for the underage group, but the percentage of A's was slightly higher for the regular group. The study indicated that the pupils older at time of entrance did not achieve any better than the average pupil.
3. The chronological age of neither the regular nor the underage pupil determines his future success in school.
4. The chief causes of failure; irregular attendance, and physical immaturity, were the same for both groups.
5. Mental age was the only consistent factor which seemed to determine the success or failure of the 960 pupils considered in this study.

6. A mental age of 5-10 would seem to be a fair and reasonable entrance requirement.

The entrance requirements for the Edmonton Public Schools are also based on a combination of chronological age and mental age. However, they are not as lenient as those of Plymouth, Massachusetts[32], where the lower limit of chronological age is five years, provided those under five years six months have a mental age of 5-8. In Edmonton[33] the chronological age limit is February 28, with the provision that the prospective beginner whose sixth birthday comes after September 1 may be rejected if an average mental age of over 5-9 is not attained on the following two tests; Detroit Beginning First-Grade Intelligence Test and the California Short-Form Test of Mental Maturity.[x]

[x] Used since 1954 for borderline cases.

SUMMARY OF FINDINGS

1. There is a very definite lack of unanimity of opinion among authorities as to what effect the lowering of entrance age has had upon the achievement of pupils.

2. There is also a very great difference of opinion as to what is the most suitable criterion upon which to base entrance requirements. Some authorities prefer only a mental age requirement but admit that if it is used there must be provision made for those children who are over six years of age at time of entrance but do not have the mental ability to meet the entrance requirement. There are those authorities who believe that chronological age should be the sole criterion but point out that the curriculum must provide for the individual differences, especially among the younger entrants, if financial loss to the taxpayer and personal harm to the pupil is to be avoided.

3. Where the entrance requirement is a combination of chronological age and mental age, it has been found that the younger entrants, who were able to meet the mental age requirements, achieve as well as the older entrants.

CHAPTER III

PROCEDURE

Definition of Terms

It has been found necessary for the purposes of this study to define a number of commonly used terms so that any deviation from common usage will be more readily understood.

Entrance Age.

The term 'entrance age' as referred to in this study is a combination of chronological age and mental age as determined by the present entrance regulations of the Edmonton Public School System which state: all children who are six years old before the first day of September may enter on opening day. All other children whose sixth birthday comes on or before the last day of the following February may also enter provided they have a mental age of 5-9.

Mental Age at Time of Entrance

"Intelligence is usually expressed in terms of mental age and intelligence quotient. The mental age indicates in a general way the level of difficulty of what a child can learn. From the standpoint of readiness for school, the mental age gives a better prediction

of performance in first-grade work than the intelligence quotient does, because it shows the general level of mental ability which the child has reached."[34]

The mental age scores used in this study were the scores the pupils obtained on the Detroit Beginning First-Grade Intelligence Test given at time of entrance, and recorded on the cumulative records of each pupil.

Chronological Age at Time of Entrance

The chronological age of pupils recorded in this study is the actual age of the pupils at the time they enter school. Each age was computed from September 1. That is, a pupil whose sixth birthday comes in October of the same year he enters school will be considered to have a chronological age at time of entrance of five years eleven months, or a pupil whose sixth birthday comes in August would have a chronological age of six years one month.

Underage Entrant

Underage entrants are pupils who are under six years of age when they enter school. Their sixth birthday would come between September 1 and February 28.

Normal Age Entrants

Normal age entrants are pupils who have attained a chronological age of six years and are under six years seven months at time of entrance. Their sixth birthday

comes between February 28 and September 1 of the year they begin school.

Overage Entrants

Overage entrants are pupils who have a chronological age of six years seven months or over at time of entrance. Most of the pupils in this group are those who were not allowed to enter the previous year because they could not meet the mental age requirements of the entrance regulations.

Retarded Pupil

A retarded pupil, as referred to in this study, is a pupil who has repeated one or more grades.

Data Cards[x]

Cards were printed, with appropriate spaces and headings, for the necessary information taken from the cumulative records.

Data Required

To carry out an investigation on this topic it was necessary to obtain information on a large number of pupils who had taken all their elementary school education in the Edmonton Public School System. The information would necessarily have to include: personal data, such as date of birth; chronological age at time of

x see Appendix A

entrance; mental age at time of entrance; intelligence quotient; standardized achievement test scores; final grade VI marks; number of regular promotions, retardations, recommendations, honor standings, and accelerations; attendance of each pupil for each year; and data pertaining to the personality development of the pupils included in this study.

Source and Selection of Data

Permission was granted by the Superintendent of Edmonton Public Schools to obtain information needed for this study from the Cumulative Records of pupils in the Edmonton Public School System. To obtain information on the pupils completing grade VI in June 1956, it was necessary to use the records of pupils who were in grade VII in September 1956. Thus those pupils who repeated grade VII in 1956-57 were also included.

In choosing the schools from which the data for this investigation was obtained, the City of Edmonton was divided into five geographic areas with two Junior High Schools in each area. These areas represented the four corners and center of the city, thus the sample obtained was in some way representative of all the socio-economic areas within the city. It was also found when examining the cumulative records that many of the pupils had transferred from one school to another within the city

two or three times. This gave further representative distribution to the sample.

The data were obtained from the inspection of the cumulative records of 1251 of the 2756 pupils registered in grade VII in September 1956. However, due to the influx of people into the city, only 640 or 28 per cent of these pupils had cumulative records which were sufficiently complete to be of value, as only those children who began school in the city had the results of the Detroit Beginning First-Grade Intelligence Test recorded on their cumulative records.

The mental ages obtained by using the Detroit Test were chosen in preference to the mental ages obtained by using the Laycock Intelligence Test (a test given to all grade V pupils in the Edmonton Public Schools) because it was the test used by the Edmonton Public School System to decide whether or not the underage entrants were mentally mature enough to begin school. Moreover, the Detroit test is specifically designed to aid in the classification of children entering the first grade. The correlation between the weighted scores of the Detroit and the Stanford-Binet mental age scores of 116 first-grade children was found to be .91. The correlation between successive administrations of the same form of the test, based on 407 cases with a four month interval between testings, was found to be .76.[35]

ORGANIZATION AND PRESENTATION OF DATA

Chronological Age Groups

In order to compare the effect of chronological age at time of entrance upon subsequent achievement of groups of younger entrants, with groups of older entrants, the data cards were arranged in the following groups, grouped according to the chronological ages of the pupils at times of entrance.

Group 1	5 yr. 7 mo. to 5 yr. 9 mo.
Group 2	5 yr. 10 mo. to 6 yr.
Group 3	6 yr. 1 mo. to 6 yr. 3 mo.
Group 4	6 yr. 4 mo. to 6 yr. 6 mo.
Group 5	6 yr. 7 mo. and over

The ages for these groupings were chosen as they coincided with September 1 and February 28, the two dates used in the entrance regulations of the Edmonton Public School System. For purposes of this study, pupils in Groups 1 and 2 were considered to be underage entrants. Those in Groups 3 and 4 were normal age entrants, and those in Group 5 were overage entrants.

Mental Age Sections

To obtain a comparison between the effect of mental age at time of entrance upon achievement and the effect of chronological age at time of entrance upon achievement, the data cards for each chronological age group were subdivided

into three mental age sections. In order to have approximately the same number of cases in each section it was necessary to group the mental ages for each section in the following manner:

Mental Age Section A - up to 6 yr. 3 mo.

Mental Age Section B - 6 yr. 4 mo. to 7 yr. 3 mo.

Mental Age Section C - 7 yr. 4 mo. and over

Achievement

In order to compare the achievement of younger entrants with older entrants, the grade scores of the following standardized achievement tests were totalled and means computed for each chronological age group and mental age section.

Grade II Level (1) Gates Advanced Primary Reading Tests, Type I, Word Recognition, Grade II

(2) Gates Advanced Primary Reading Tests, Type II, Paragraph Reading, Grade II

Grade IV Level (1) Edmonton Public School Spelling Ability Test, Grade IV

(2) Word Meaning Test, Grade IV

(3) Unit Scales of Attainment Test, Reading-Comprehension, Division I, Form A, Grade IV

Grade VI Level (1) Edmonton Public School Spelling Ability Test, Grade VI

(2) Unit Scales of Attainment Tests, Reading Comprehension, Division 2, Form B, Grade VI

In addition to the above standardized tests a comparative analysis in the chronological age groups and mental age sections was made for:

(1) The final grade six marks in the following subjects; Oral Reading, Silent Reading, Oral Language, Written Language, Spelling, Accuracy and Problem Solving in Arithmetic;

(2) Intelligence quotients;

(3) The attendance for six years.

The results obtained are summarized in Chapter IV.

Pupil Progress

The progress of pupils was determined by comparing the number and percentages of retardations, recommendations, honor standings, regular promotions and accelerations in the chronological age groups and mental age sections. A comparative analysis has been made in Chapter V of the effect of age at time of entrance on pupil progress.

Personality Development

The personality development of the pupils considered was determined from the ratings recorded on the

cumulative records for the following six traits:[36]

(1) Emotional Control

(2) Creativeness

(3) Judgment

(4) Co-operation

(5) Dependability

(6) Courtesy

The ratings for each trait given at the end of each of the six school years for each pupil in Group 1 and 4 were totalled and the percentages computed. The findings are presented in Chapter VI.

CHAPTER IV

EFFECT OF ENTRANCE AGE ON ACHIEVEMENT

In the Edmonton Elementary Public School System the evaluation of pupil achievement in each subject is made on the basis of teacher-prepared tests, such standardized tests as are available, and a consideration of each pupil's day-to-day efforts. Since for this study it is desirable to have a measure of achievement which is uniform, the grade scores of seven standardized achievement tests have been used to determine the effect of age at time of entrance on subsequent achievement. In addition to the seven standardized achievement tests, the final grade six marks have been used as a further measure of achievement at the grade VI level. The average attendance for each chronological age group is presented in order to determine whether or not it is a factor causing differences, if any, in achievement of the younger entrants as compared with the older entrants.

The achievement of the pupils in the five chronological age groups and three mental age sections has been compared by using the following data:

1. The mean grade scores of two standardized tests given at the grade II level.

2. The mean grade scores of three standardized tests given at the grade IV level.
3. The mean grade scores of two standardized tests used at the grade VI level.
4. The averages for the final grade VI marks for seven subjects.
5. The average I.Q. scores for each chronological age group.
6. The differences between Group 1 and Group 5 in standardized test results, final grade VI marks, attendance, and I.Q. scores.
7. Average attendance for the six years for pupils in each chronological age group.

1. Comparison of Achievement at Grade II Level

During the last week of May two reading tests are given to all the grade II pupils in the Edmonton Elementary Public Schools. The results of these tests are recorded on the cumulative record of each pupil. Standardized grade scores for these tests have been established for the Edmonton Elementary Public Schools. The average grade II pupil would be expected to receive a grade score of 3.0 at the end of June.

Table I indicates the means of the grade scores of the Gates Advanced Primary Reading Tests, Type I, Word Recognition, of 640 pupils grouped according to

chronological age and mental age at time of entrance.

TABLE I

MEAN GRADE SCORES OF GATES
ADVANCED PRIMARY READING TESTS, TYPE I,
WORD RECOGNITION

Mental Age Sections		Chronological Age Groups					
		1	2	3	4	5	Mean
	N	113	131	156	149	91	
Sec. A	204	2.6	2.7	2.8	2.7	2.4	2.6
Sec. B	226	3.0	2.9	3.2	3.1	2.9	3.0
Sec. C	210	3.4	3.5	3.5	3.2	3.2	3.4
Mean		3.0	3.0	3.2	3.0	2.8	3.0

In Table I the difference in means between the chronological age groups does not exceed two months. The difference between the means of the mental age sections is four months.

The second reading test given at the end of Grade II is Gates Advanced Primary Reading Test, Type II, Paragraph Meaning. The means of the grade scores for each chronological age group and mental age section is shown in Table II.

TABLE II

MEAN GRADE SCORES OF GATES ADVANCED PRIMARY READING TESTS, TYPE II, PARAGRAPH MEANING

Mental Age Sections		Chronological Age Groups					Mean
		1	2	3	4	5	
	N	113	131	156	149	91	
Sec. A	204	2.7	2.7	2.8	2.8	2.4	2.7
Sec. B	226	3.2	3.0	3.1	3.4	3.0	3.1
Sec. C	210	3.5	3.5	3.6	3.4	3.1	3.4
Mean		3.1	3.1	3.2	3.2	2.8	3.1

In Table II the difference in the means of the grade scores between Group 1 and 2, the underage entrants, and Groups 3 and 4, the normal age entrants, is approximately one month. The mean of the grade scores of Group 5, the overage entrants, is three months lower than the mean of the underage entrants.

The difference in means between each mental age section is over three months.

In order to determine whether or not the difference in means between the combined grade scores of Groups 1 and 2, the underage entrants, and the combined grade scores of Groups 3 and 4, the normal age entrants, is significant or due to chance errors in sampling, a statistical analysis is presented in Table III.

TABLE III

RESULTS OF STATISTICAL ANALYSIS OF THE DIFFERENCE IN MEANS OF GATES READING TESTS, TYPE I, WORD RECOGNITION, AND GATES READING TESTS, TYPE II, PARAGRAPH MEANING, FOR UNDERAGE ENTRANTS AND NORMAL AGE ENTRANTS

Item	Means		Standard Deviations		Critical Ratios Pertaining to	
	Underage Entrants	Normal Entrants	Und. Ent.	Nor. Ent.	Arith. Means	Standard Deviations
Gates Test I	3.00	3.09	.62	.46	.32	4.73
Gates Test II	3.09	3.18	1.32	1.00	.31	4.57

The figures in Table III reveal that with a difference in standard deviations of .16 or approximately two months, the critical ratios pertaining to the standard deviations are 4.73 for the Gates Reading Tests, Type I and 4.57 for Gates Reading Tests, Type II. The null hypothesis was set up on the basis of there being no significant difference between the standard deviations of the two groups. Since a critical ratio of only 1.96 is required to reject the null hypothesis at the .05 level, with critical ratios of 4.73 and 4.57 it must be concluded that there is a significant difference in variability of achievement between the two groups at the grade II level.

The standard procedure for calculating critical ratios of the means would assume that the underage and

and normal age groups are drawn from populations of equal variance. Since this hypothesis was shown to be inappropriate, it is necessary to use the Cochran-Cox formula,[x] which employs a hypothesis of equal means not affected by group variances. The observed critical ratio of 0.32 for the Gates Reading Tests, Type I and 0.31 for Gates Reading Tests, Type II are not larger than the necessary critical ratio of 1.96. Therefore the hypothesis of equal means is not rejected at the .05 level of confidence.

From the figures presented in Table III it may be assumed that chronological age at time of entrance has no significant effect upon the reading ability at the grade II level. Cron and Koontz[37] would agree, as they report that a few months difference in age is a poor index for determining achievement of pupils in the primary grades.

The difference in means of the grade scores on Gates Reading Tests, Type I (Table I) and Gates Reading Tests, Type II (Table II) between each of the three mental age sections is three months or over. The difference in means between mental age Sections A and B has been statistically analyzed to determine whether or not they are significant. The results are presented in Table IV.

x Formula taken from Johnson, P.O., Statistical Methods in Research, Prentice-Hall, Inc., N.Y. 1950 p.75

TABLE IV

RESULTS OF STATISTICAL ANALYSIS OF THE DIFFERENCE IN MEANS OF GATES READING TESTS, TYPE I, WORD RECOGNITION AND GATES READING TESTS, TYPE II, PARAGRAPH MEANING, FOR MENTAL AGE SECTIONS A AND B

Item	Means		Standard Deviations		Critical Ratios Pertaining to	
	Section A	Section B	Sec. A	Sec. B	Arith. Means	Standard Deviations
Gates Test I	2.71	3.06	.53	.66	4.57	1.00
Gates Test II	2.77	3.10	.96	.73	3.33	.40

The figures in Table IV show that differences in means of .35 obtained from the Gates Tests I and .33 from the Gates Tests II give critical ratios pertaining to the arithmetic mean of 4.57 and 3.33 respectively. Garrett[38] considers a critical ratio which is greater than 1.96 at .05 level of confidence as being a significant difference in the means. The critical ratios of 1.00 and .40 pertaining to the standard deviations as found in Table IV indicate that the variability of the two groups is not significant at the .05 level of confidence.

The critical ratio found in Table IV shows that there is a significant difference in the average achievement between the mental age sections at the grade II level. Therefore, mental age at time of entrance seems to be a determining factor in subsequent

achievement, particularly in the field of reading.

These findings are corroborated by Morphett and Washburne[39] who find that there is a correlation ranging from .50 to .65 between mental age and ability to learn to read.

2. Comparison of Achievement at Grade IV Level

In considering the effect of age at time of entrance on the achievement of pupils at the grade IV level, the results of the following three tests were used: The Edmonton Public School Spelling Ability Test, the Word Meaning Test and the Unit Scales of Attainment, Test Grade IV. These tests are commonly administered at the end of the school year to all pupils in grade IV in the Edmonton Public Schools.

The first two tests were designed and grade scores standardized by a Subcommittee of the Edmonton Elementary Teachers' Educational Policy Committee. The grade scores of the Unit Scales of Attainment Tests have also been standardized for the Edmonton Elementary Public Schools. The mean grade score expected when the tests are administered to grade IV pupils at the end of the school year is 5.0.

A summary of the means of the grade scores of these tests for the pupils considered in this study is presented in Table V.

TABLE V

MEAN GRADE SCORES OF SPELLING ABILITY TEST, WORD MEANING TEST AND UNIT SCALES OF ATTAINMENT TEST, GRADE IV

Achievement Tests		Chronological Age Groups					
		1	2	3	4	5	Mean
	N	113	131	156	149	91	
E.P.S. Spelling Ability Test	Sec. A	4.4	4.5	4.4	4.3	4.1	4.3
	Sec. B	5.0	4.7	5.0	5.2	4.4	4.9
	Sec. C	5.2	5.1	5.5	5.3	4.5	5.1
	Mean	4.8	4.8	4.9	4.9	4.3	4.8
Word Meaning Test	Sec. A	5.4	5.4	5.2	5.0	4.8	5.2
	Sec. B	5.7	5.8	5.9	5.9	5.4	5.7
	Sec. C	6.0	6.4	6.4	6.1	5.7	6.1
	Mean	5.7	5.9	5.8	5.7	5.3	5.7
Unit Scales of Attainment Test	Sec. A	4.6	4.4	4.2	4.2	4.2	4.3
	Sec. B	4.9	4.9	4.9	4.9	4.5	4.8
	Sec. C	4.9	5.5	5.3	4.9	4.8	5.1
	Mean	4.8	4.8	4.8	4.6	4.5	4.7

The difference in means as shown in Table V between the underage entrants and the normal age entrants does not exceed two months. The difference in means between the mental age sections exceeds three months.

In order to determine whether or not there is a significant difference in means of the grades scores obtained by the underage entrants, Groups 1 and 2, and the normal age entrants, Groups 3 and 4, on the Unit Scales of Attainment Test, Grade IV, a statistical analysis is presented in Table VI.

TABLE VI

RESULTS OF STATISTICAL ANALYSIS OF THE DIFFERENCE IN MEANS OF THE UNIT SCALES OF ATTAINMENT TEST, GRADE IV, FOR THE UNDERAGE ENTRANTS AND NORMAL AGE ENTRANTS

Item	Means		Standard Deviations		Critical Ratios Pertaining to	
Unit Scales of Attainment	Underage Entrants	Normal Entrants	Und. Ent.	Norm. Ent.	Arith. Means	Standard Deviations
	4.80	4.71	1.44	1.20	.21	2.50

The difference in standard deviations of the combined grade scores of Group 1 and 2, the underage entrants, and the combined grade scores of Groups 3 and 4, the normal age entrants, as indicated in Table VI is 0.24. This difference in standard deviation gives a critical ratio of 2.50. Therefore, the variability of the scores of the two groups is considered significant at the .05 level of confidence.

Since the variance of the two groups was shown to be significantly different, the use of the null hypothesis was substituted for one of equal means. On the basis of these calculations the critical ratio pertaining to the means is 0.21 which indicates that the equal means hypothesis is not rejected.

The difference in means obtained from the Unit Scales of Attainment Test, Grade IV, for mental age Sections A and B has been statistically analyzed in Table VII.

TABLE VII

RESULTS OF STATISTICAL ANALYSIS OF THE DIFFERENCE IN MEANS OF THE UNIT SCALES OF ATTAINMENT TEST, GRADE IV, FOR MENTAL AGE SECTIONS A AND B

Item	Means		Standard Deviations		Critical Ratios Pertaining to	
	Section A	Section B	Sec. A	Sec. B	Arith. Means	Standard Deviations
Unit Scales of Attainment	4.32	4.87	1.30	1.36	3.92	.60

The difference in means of .55 as shown in Table VII gives a critical ratio pertaining to the arithmetic mean of 3.92. This critical ratio indicates that there is a significant difference in the arithmetic means of the two sections. The low critical ratio pertaining to the standard deviation indicates that the difference in the variability between the groups is not significant.

The statistical analyses presented in Tables VI and VII indicate that there is no significant difference between the mean grade scores obtained by the underage entrants and the normal age entrants on the Unit Scales of Attainment Test, Grade IV, but there is a significant difference between the means of the grade scores of the mental age sections.

The data presented in Table V pertaining to the Edmonton Public School Spelling Ability Test, Grade IV, Word Meaning Test, Grade IV, and Unit Scales of Attainment Test, Grade IV, indicate that for the same number of pupils tested, there are similar differences in mean grade scores. A cursory examination of the results of the Edmonton Public School Spelling Ability Test, Grade IV, and the Word Meaning Test, Grade IV, would suggest that the variability of scores would follow the same trend as that found for the Unit Scales of Attainment Test, Grade IV (Table VI).

Therefore, at the Grade IV level it may be concluded that there is no significant difference in achievement between the underage entrants and the normal age entrants. However, in comparing the mental age Sections A and B it will be noted that a significant difference does exist.

3. Comparison of Achievement at Grade VI Level

A comparison of the achievement at the grade VI level has been made to determine whether or not the younger pupils are able to overcome the disadvantage, if any, of early entrance.

The mean grade scores for each chronological age group and mental age section, obtained on the Edmonton Public School Spelling Ability Test and the Unit Scales of Attainment Test, Grade VI, are presented in Table VIII. These are the only standardized tests

recorded on the cumulative records for grade VI pupils. The mean grade score expected for grade VI pupils at the end of June is 7.0.

TABLE VIII

MEAN GRADE SCORES OF SPELLING ABILITY TEST AND UNIT SCALES OF ATTAINMENT TEST, GRADE VI

Achievement Tests		Chronological Age Groups					
		1	2	3	4	5	Mean
	N	113	131	156	149	91	
E.P.S. Spelling Ability Test	Sec. A	6.5	6.6	6.6	6.6	6.3	6.5
	Sec. B	7.3	7.7	7.1	7.7	6.8	7.3
	Sec. C	7.5	7.9	8.0	7.6	6.8	7.5
	Mean	7.1	7.4	7.2	7.3	6.6	7.1
Unit Scales of Attainment Test	Sec. A	6.9	7.0	7.4	6.8	6.2	6.9
	Sec. B	7.5	7.2	7.5	8.0	7.1	7.5
	Sec. C	7.9	8.1	8.1	8.0	7.8	8.0
	Mean	7.4	7.4	7.7	7.6	7.0	7.4

The difference in means between the underage entrants and the normal age entrants as indicated in Table VIII does not exceed three months.

In Table VIII the difference in means of the mental age sections ranges from over two months to eight months.

A statistical analysis of the difference in means obtained from the Unit Scales of Attainment Test,

Grade VI, between the underage entrants and the normal age entrants is presented in Table IX.

TABLE IX

RESULTS OF STATISTICAL ANALYSIS OF THE DIFFERENCE IN THE MEANS OF THE UNIT SCALES OF ATTAINMENT TEST, GRADE VI, FOR THE UNDERAGE ENTRANTS AND THE NORMAL AGE ENTRANTS

Item	Means		Standard Deviations		Critical Ratios Pertaining to	
Unit Scales Grade VI	Underage Entrants	Normal Age Entrants	Under-age	Normal Age	Arith. Means	Standard Deviations
	7.41	7.61	1.41	.74	.30	2.16

In Table IX the critical ratio of 2.16 pertaining to the standard deviations indicates that there is a significant variability in scores obtained by the two groups.

Since the standard deviation is significant the use of the null hypothesis was substituted for a hypothesis of equal means which is not affected by unequal group variances. With a critical ratio pertaining to the arithmetic mean of only .30, the hypothesis of equal means is not rejected at the .05 level of confidence.

In Table X the means of the grade scores obtained from the Unit Scales of Attainment Test, Grade VI, between Mental Age Sections A and B have been treated statistically to determine the significance of the difference in the means and standard deviations.

TABLE X

RESULTS OF STATISTICAL ANALYSIS OF THE DIFFERENCE IN MEANS OF THE UNIT SCALES OF ATTAINMENT TEST, GRADE VI, FOR MENTAL AGE SECTIONS A AND B

Item	Means		Standard Deviations		Critical Ratios Pertaining to	
Unit Scales Grade VI	Section A	Section B	Sec. A	Sec. B	Arith. Means	Standard Deviation
	7.04	7.54	1.14	1.15	4.00	.12

A mean difference of five months between mental age Sections A and B, as revealed in Table X, gives a critical ratio of 4.00. This difference must be considered highly significant. On the other hand, a critical ratio of .12 pertaining to the standard deviations indicates that there is no significant difference in the variability of the scores of the two sections.

The difference in means obtained from the Unit Scales of Attainment Test, Grade VI (Table IX), between the underage entrants and the normal age entrants is not considered to be significant. The difference in means (Table X) between the mental age Sections A and B is significant.

The figures presented in Table VIII show a marked similarity in difference in means obtained by pupils in each chronological age group and mental age section, from the Edmonton Public School Spelling Ability

Test, Grade VI, and the Unit Scales of Attainment Test, Grade VI. Since the means are similar, and the number of pupils the same for the two tests, an examination of the data would seem to indicate that the variability of scores would follow the same trend as that found for the Unit Scales of Attainment Test, Grade VI. Therefore, it may be concluded that mental age at time of entrance is a greater determining factor in subsequent achievement than chronological age.

A further comparison of achievement of the chronological age groups and mental age sections was made at the grade VI level by considering the final grade VI marks given for the following seven subjects: Oral Reading, Silent Reading, Oral Language, Written Language, Spelling, Accuracy and Problem Solving in Arithmetic. The marks obtained by the pupils in all of the above subjects were totalled and averages computed. The averages for all the groups and sections are presented in Table XI.

TABLE XI

AVERAGE OF THE GRADE VI FINAL MARKS, IN PERCENTAGES

Mental Age Sections		Chronological Age Groups					Average
		1	2	3	4	5	
	N	113	131	156	149	91	
Section A	204	64	63	64	65	56	62
Section B	226	70	67	67	72	65	68
Section C	210	73	76	76	73	65	72
Average		69	69	69	70	62	68

Table XI reveals that there is marked similarity between the marks obtained by the underage entrants and the normal age entrants. There is, however, a difference between the lowest mental age section and the highest mental age section. Mental Age Section A has an average of 62 per cent, Section B has 68 per cent, and Section C has 72 per cent. The range of differences in the percentage marks for the subjects coincides very closely with the range of differences found in the standardized achievement tests.

4. Comparison of I.Q. Scores

The fact that the underage entrants were able to achieve as well as the normal age entrants, and the overage entrants consistently received marks below the others, may be explained by the differences in I.Q. scores.

Table XII shows the mean I.Q. scores for each of the five chronological age groups as determined by the Detroit test given to the beginners, and the Laycock test given in grade V.

TABLE XII

THE MEAN I.Q. SCORES OF DETROIT AND LAYCOCK INTELLIGENCE TESTS FOR EACH CHRONOLOGICAL AGE GROUP

		Chronological Age Groups					
		1	2	3	4	5	Mean
	N	113	131	156	149	91	
Detroit		116	112	108	105	98	108
Laycock		113	111	109	106	99	108

The I.Q. scores presented in Table XII show that the younger the entrants the higher the I.Q. score. This is caused mainly by the mental age requirements of the entrance regulations of the Edmonton Public Schools. There is no selection made among the normal age entrants, but the underage children are not admitted unless their mental age score is 5.9 or over. Thus children who are unable to meet the mental age requirements must wait one year before entering school. These overage pupils are all in Group 5 which may account for the low I.Q. scores and lower achievement scores for this group.

5. A Comparison of Group 1 and Group 5

The pupils in Group 5 were one year older chronologically at time of entrance than the pupils in Group 1. If chronological age at time of entrance has any effect upon achievement, it should be apparent when the data used for these two groups are compared. Table XIII indicates the difference in achievement test results, final grade VI marks, average attendance and I.Q. scores, between Group 1 and Group 5.

TABLE XIII

A COMPARISON OF THE MEANS OF THE GRADE SCORES OF SEVEN STANDARDIZED ACHIEVEMENT TESTS, GRADE VI FINAL MARKS, ATTENDANCE AND I.Q. SCORES, FOR GROUPS 1 AND 5

Item Compared	Chronological Age Groups 1	5	Differences
Gates Advanced Primary Reading Tests, Type I	3.0	2.8	.2
Gates Advanced Primary Reading Tests, Type II	3.1	2.8	.3
Spelling Ability Test, Grade IV	4.8	4.3	.5
Word Meaning Test, Grade IV	5.7	5.2	.5
Unit Scales of Attainment Test, Grade IV	4.8	4.5	.3
Spelling Ability Test, Grade VI	7.1	6.6	.5
Unit Scales of Attainment Test, Grade VI	7.4	7.0	.4
Final Marks, Grade VI	69%	62%	7%
Attendance Per Year	184	183	1
Detroit I.Q.	116	98	18
Laycock I.Q.	113	99	14

The results as indicated in Table XIII show that the difference in means for the standardized achievement tests obtained by Group 5 are from two months to five months lower than those of Group 1. The difference of 7 per cent in the final grade VI marks may be due to the

difference in I.Q. scores. The difference of one day in attendance would not seem to be a factor causing differences in achievement.

Table XIV presents a statistical analysis of the difference in means between Group 1 and 5 for the Gates Reading Tests, Type I, and the Spelling Ability Test, Grade IV.

TABLE XIV

RESULTS OF STATISTICAL ANALYSIS OF THE DIFFERENCE IN MEANS OF GATES READING TESTS, TYPE I, WORD RECOGNITION, AND SPELLING ABILITY TEST, GRADE IV, FOR GROUPS 1 AND 5

Item	Means		Standard Deviations		Critical Ratios Pertaining to	
	Group 1	Group 5	Group 1	Group 5	Means	Standard Deviations
Gates Test I	3.02	2.82	.57	.60	2.50	.50
Sp. Ab. Test IV	4.80	4.30	.10	.10	3.33	.60

The critical ratios pertaining to the means in Table XIV are both above 1.96. Therefore, the difference in means between Groups 1 and 5 for the two standardized tests are significant. Since there is a significant difference between the means of the grade scores of Groups 1 and 5 it would seem that keeping underage pupils, with mental ages below 5-9 at time of entrance, out of school for one year is justifiable.

6. Attendance

Regularity of attendance naturally has a bearing upon the achievement of pupils. In order to determine whether or not attendance is a factor in the differences in achievement among the chronological age groups the average attendance for each group and section for the six years was computed and presented in Table XV.

TABLE XV

AVERAGE YEARLY ATTENDANCE
DURING SIX YEAR PERIOD

	Chronological Age Groups					
Mental Age Sections	1	2	3	4	5	Average
Section A	184.1	183.9	182.6	184.0	184.7	183.3
Section B	184.5	180.8	183.8	184.2	184.2	183.4
Section C	184.2	182.6	182.9	179.5	182.8	182.2
Average	184.2	182.4	183.1	182.6	183.9	183.9

The average attendance of the underage entrants is .5 days more than the normal age entrants. The difference in attendances between the mental age sections is almost negligible. Since the difference in attendance between the chronological age groups is so very small, it may be assumed that underage entrants have the physical maturity to attend school as regularly as the older entrants.

SUMMARY OF FINDINGS

1. The results of the statistical analyses of the two Gates Reading Tests given at the grade II level, the Unit Scales of Attainment Test, Grade IV, given at the Grade IV level and the Unit Scales of Attainment Test, Grade VI, given at the grade VI level, indicate no significant difference in average achievement between the underage entrants and the normal age entrants. While there is a significant group variance, this variance does not affect the difference in means which has been shown to be non-significant.
2. The difference in means of the grade scores between the mental age Sections A and B, obtained from the Gates Reading Tests, Type I and II, grade II level, the Unit Scales of Attainment Test, grade IV level, and the Unit Scales of Attainment Test, grade VI level, when treated statistically indicate a significant difference in the average achievement of the two sections. Furthermore, the variability of the standard deviations is found to be non-significant.
3. The overage entrants have achievement scores which are consistently lower than the underage and normal age entrants.

4. The averages of the grade VI final marks are found to be the same for the underage and normal age entrants, but the average for the overage entrants is approximately 7 per cent lower.
5. The underage entrants have a higher I.Q. than the other groups. This is due mainly to the selection caused by the 5-9 mental age requirement.
6. When the data for Groups 1 and 5 were compared, it was found that although the pupils in Group 5 were a year older than those in Group 1, their grade scores were lower.
7. Finally, there is no substantial difference in the regularity of attendance among the five chronological age groups, or the three mental age sections, which might have a significant bearing on achievement.

CHAPTER V

EFFECT OF ENTRANCE AGE ON PUPIL PROGRESS

The extent to which chronological age and mental age at time of entrance influences the progress of pupils in the Edmonton Elementary Public School throughout the first six grades may be determined by comparing the number of retardations, recommendations, regular promotions, honor standings and accelerations in each of the chronological age groups and mental age sections.

Definitions

Subject Ratings

Subject Ratings in the Edmonton Elementary Public Schools are recorded in Division I by the following letters: H - Excellent; A - Very Good; B - Good; C - Fair; D - Poor. In Division II the following letter ratings and percentages are used: H - Excellent (100 - 85); A - Very Good (84 - 70); B - Good (69 - 55); C - Fair (54 - 40); D - Poor (under 40).[40]

Retardation

Retardation is used in this study to indicate nonpromotion or failure. Pupils in Division I receiving nearly all D's are required to repeat the grade or be recommended. In Division II pupils with marks below 40 per cent in any of the following subjects: Oral

Reading, Silent Reading, Oral Language, Written Language, Spelling, Accuracy and Problem Solving in Arithmetic, or an average below 55 per cent are failed or recommended. In most cases the decision to retard or recommend a pupil is made by the teacher after consultation with parents, principal and other members of the staff.

Recommendation

In the Edmonton Public School System the term recommend is used to indicate conditional promotion. Pupils who are recommended are given a two-month's trial in the next grade the following term and if their work is satisfactory they remain in that grade. There are two instances where recommendations are used frequently. First, when there is doubt in the mind of the teacher of the advisability of promoting a pupil, a recommend is given in the hope that the pupil will gain enough maturity in the intervening four months to cope with the higher grade. Second, overage pupils, who are unable to meet the promotion requirements because of low mental ability, are given a two-month's trial in the next grade the following school year. This is done in an attempt to keep the pupils in a group more nearly their own social age. While it is not possible from the data used in this study to determine the number of recommended pupils who were demoted,

Clarke,[41] reports that only 15 per cent of the pupils conditionally promoted in the Province of Alberta are demoted. Therefore, he concludes "that for the majority conditional promotion means promotion."

Regular Promotions

Regular promotions are given to pupils in Division I who have ratings above D on their final report. In Division II pupils who have marks above 40 per cent in each subject and an average of over 55 per cent are given regular promotions.

Honor Standing

An honor standing is awarded to pupils who have an average of over 85 per cent on subjects taken during the year.

Acceleration

An accelerated pupil is one who successfully completes two grades in one year. The Edmonton Public School System has no definite policy regarding accelerations. However, each year a few pupils who do exceptionally good work are allowed to complete two grades in one year.

1. Retardations

The number of retardations for each of the five chronological age groups and three mental age sections for the first six grades were computed and percentages

compiled in order to determine whether or not there is any trend or pattern which might reveal the effect of age at time of entrance upon the number of children who are required to repeat one or more grades in the Edmonton Elementary Public Schools.

Table XVI shows the number and percentage of retardations found among the 640 pupils considered in this study, grouped according to their chronological ages and mental ages at time of entering school. Percentages were computed by dividing the number of retardations in each group or section by the total number of pupils in each group or section and multiplying by 100. A similar procedure was used for computing percentages in all other tables in this chapter.

TABLE XVI

NUMBER AND PERCENTAGE OF RETARDATIONS

Mental Age Sections		Chronological Age Groups 1	2	3	4	5	Total	%
	N	113	131	156	149	91	640	
Section A	204	14	32	24	25	18	113	55
Section B	226	5	13	22	1	5	46	20
Section C	210	3	2	9	1	4	19	9
Total	640	22	47	55	27	27	178	
%		19	36	35	19	30	28	

Chronological age at time of entrance does not appear to have any marked effect upon the number of retardations. The combined percentage of retardations for Groups 1 and 2, the underage entrants, are practically the same as the combined percentage of retardations for Groups 3 and 4, the normal age entrants.

Table XVI indicates that Section A, the lowest mental age group, has 113 retardations or 55 per cent, while Section C, the highest mental age group, has only 19 retardations or 9 per cent. This would indicate that mental ability at time of entrance has a very definite influence upon the number of retardations.

The number and percentage of retardations in each grade for each chronological age group is indicated in Table XVII.

TABLE XVII

NUMBER AND PERCENTAGE OF RETARDATIONS BY GRADES AND CHRONOLOGICAL AGE GROUPS

		Grades							
C.A. Groups	N	I	II	III	IV	V	VI	Total	%
1	113	6	6	2	6	2	-	22	19
2	131	16	8	11	4	3	5	47	36
3	156	13	11	9	7	2	13	55	35
4	149	7	5	5	5	4	1	27	19
5	91	6	3	3	6	3	6	27	30
Total	640	48	33	30	28	14	25	178	
%		7.5	5.2	4.7	4.3	2.2	3.9	28	

Table XVII shows that 48 or 7.5 per cent of the grade I pupils were retarded one or more times. The number and percentage of retardations decline progressively through the first five grades. Reasons for the increase in the number and percentage of retardations at the grade VI level are not evident. It may be that teachers hesitate to recommend a pupil to Junior High School.

The number and percentage of retardations by grades and mental age sections is shown in Table XVIII.

TABLE XVIII

NUMBER AND PERCENTAGE OF RETARDATIONS BY GRADES AND MENTAL AGE SECTIONS

		Grades							
M.A. Sections	N	I	II	III	IV	V	VI	Total	%
Sec. A	204	31	18	21	19	8	16	113	55
Sec. B	226	10	11	7	7	4	7	46	20
Sec. C	210	7	4	2	2	2	2	19	9
Total	640	48	33	30	28	14	25	178	
%		7.5	5.2	4.7	4.3	2.2	3.9	28	

In Table XVIII the figures indicate that in grade I there are 31 retardations in mental age Section A, 10 in Section B and 7 in Section C. The same trend is

evident in the first six grades for the three mental age sections. There are 46 per cent more retardations in the lowest mental age section than in the highest mental age section. In grade I there were 31 retardations in Section A, but only 6 in grade I in chronological age Group 1 (Table XVII). This would seem to indicate that mental age at time of entrance has a greater influence on retardation at the grade I level than chronological age.

The 7.5 per cent retardations for grade I as shown in Table XVIII is 1 per cent higher than the 6.5 per cent found by Clarke[42] for the Province of Alberta in 1954. However, the Annual Report of the Department of Education, of the Province of Alberta[43] for 1951, shows that 1,664 of the 21,900 pupils in grade I were retarded that year. This is 7.6 per cent which compares favorably with the 7.5 per cent of retardations in grade I as shown in Table XVIII.

The 178 retardations or 28 per cent includes 46 pupils or 26 per cent who were retarded more than once in the first six grades. These figures compare favorably with those of Stroud[44] who found when examining all cumulative records of the grade VI pupils in Omaha at the conclusion of the 1944-45 school year, that 21.3 per cent were retarded one or more times and

29 per cent were retarded more than once. The rate of retardation for the province as reported by Clarke[45] is 43.5 per cent for the first eight grades. Corresponding data for the first six grades would be about 33 per cent.

From an actual count taken from the 1955-56 promotion sheets of all pupils in the Edmonton Elementary Public Schools it was found that 727 of the 19,559 in the first six grades were retarded that year. This would be 3.7 per cent per grade or approximately 22.2 per cent for the six elementary school years. The 22.2 per cent of retardation is for one year only, and no pupils who were retarded more than once could be included. Therefore, the 28 per cent of retardation found in this study compares reasonably well with the actual count for 1955-56.

2. Recommendations

When pupils are being considered for promotion there are always a number of borderline cases. The Edmonton Elementary Public School System uses the promotional device called recommendation in dealing with these cases. The number and percentages of recommendations found in each chronological age group and mental age section are presented in Table XIX.

TABLE XIX

THE NUMBER AND PERCENTAGE OF RECOMMENDATIONS

Mental Age Sections		Chronological Age Groups						
		1	2	3	4	5	Total	%
	N	113	131	156	149	91	640	
Section A	204	11	16	21	26	20	94	46
Section B	226	9	5	11	5	8	38	17
Section C	210	-	-	1	2	3	6	3
Total	640	20	21	33	33	31	138	
%		18	16	21	22	34	21.6	

The figures in Table XIX show that the underage entrants have 41 recommendations or 17 per cent, as compared with 66 or 21.5 per cent for the normal age entrants. The 34 per cent of recommendations found for Group 5, which is twice the rate for the underage entrants, may be due to the lower intelligence of the overage entrants, or it may be assumed that many of these overage pupils were promoted by means of the recommendation device to keep them in the proper social age group.

Mental age Section A has 46 per cent recommendations as compared to 17 per cent for Section B and 3 per cent for Section C. These figures show that there are approximately 15 times as many recommendations in the lowest mental age section as in the highest mental age section.

The difference in the number of recommendations between each of the chronological age groups is not as great as the difference between each of the mental age sections. Therefore, it may be concluded that the number of recommendations is determined to a greater extent by mental age of the pupils at time of entrance than by chronological age at time of entrance.

3. Honor Standings

A comparison of the number and percentage of honor standings awarded to pupils in each chronological age group and mental age section is presented in Table XX.

TABLE XX

NUMBER AND PERCENTAGE OF HONOR STANDINGS

		Chronological Age Groups						
Mental Age Sections		1	2	3	4	5	Total	%
	N	113	131	156	149	91	640	
Section A	204	1	4	4	1	1	11	5
Section B	226	13	6	18	18	4	59	27
Section C	210	15	24	51	40	9	139	61
Total	640	29	34	73	59	14	209	
%		26	26	47	39	15	33	

From the figures presented in Table XX it has been found that of the 209 honor standings awarded, the under-

age entrants received 30 per cent, the normal age entrants 63 per cent and the overage entrants 7 per cent. This one instance where being a few months older at time of entrance seems to be an advantage. Reasons for the normal age entrants receiving more honor standings than the underage entrants are not evident, as the data presented in Chapter IV indicate that the underage entrants have higher intelligence and have equal or higher achievement test scores. Perhaps this difference may be attributed to the fact that teachers when awarding honor standings take into account factors other than subject-matter achievement. These findings correspond to a study made by Handy[46] who found that while the underage entrants received a higher percentage of B's and C's, the normal age entrants received a higher percentage of A's. It seems, therefore, that older entrants are able to reach higher levels of attainment.

The figures in Table XX show that there are 56 per cent more honor standings awarded to pupils in the highest mental age section than in the lowest mental age section. While this would be expected, it does indicate that a consideration of mental age at time of entrance is necessary.

Since many pupils have been promoted with honor standings more than once in the six grades, Table XXI has been presented to indicate the number of pupils who received honor standings one or more times throughout the first six grades.

TABLE XXI

NUMBER OF PUPILS RECEIVING HONOR STANDINGS

Mental Age Sections		Chronological Age Groups						
		1	2	3	4	5	Total	%
	N	113	131	156	149	91	640	
Sec. A	204	1	4	2	1	1	9	4
Sec. B	226	7	5	7	11	2	32	14
Sec. C	210	6	11	23	17	3	60	28
Total	640	14	20	32	29	6	101	16
%		12	15	20	19	6		

Table XXI indicates that when considering the underage entrants, 34 pupils or 13.5 per cent of the total number of pupils in Groups 1 and 2 received honor standings. In Groups 3 and 4, the normal age entrants, 61 or 20 per cent received honor standings.

There are 24 per cent more pupils in mental age Section C receiving honor standings than in mental age Section A. The figures in Table XXI seem to indicate that pupils who are a few months older at time of entrance are able to reach higher standards.

4. Accelerations

It was found that 8 pupils or 1.25 per cent of the 640 pupils considered in this study were accelerated once in the first six grades. The number of accelerations for each chronological age group and mental age section is shown in Table XXII.

TABLE XXII

NUMBER OF ACCELERATIONS

Mental Age Sections		Chronological Age Groups					
		1	2	3	4	5	Total
	N	113	131	156	149	91	640
Section A	204	-	-	-	-	-	-
Section B	226	-	-	-	-	-	-
Section C	210	-	-	2	4	2	8

Table XXII shows that no underage entrants were accelerated and all accelerated pupils were in the highest mental age section. It is difficult to determine the effect of age at time of entrance on the number of accelerations. There is a possibility that some teachers would feel that these younger pupils are not socially mature enough to be placed with older pupils. However, when six of the eight accelerations are in the

normal age group and the larger percentage of honor standings are also in the normal age group, it would seem that age at time of entrance is a factor in the number of accelerations.

SUMMARY OF FINDINGS

1. There are more retardations among the normal age entrants than among the underage entrants, and the lowest mental age section has almost three times as many retardations as the highest mental age section.

2. The underage entrants have fewer recommendations than the normal age entrants. The overage entrants, those in Group 5, have 15 per cent more recommendations than the underage entrants.

3. The normal age entrants have a larger percentage of honor standings than the underage entrants. The overage entrants have 11 per cent less honor standings than the underage entrants.

4. No underage entrants were accelerated, and all accelerations were in the highest mental age section. It would seem that when accelerations and honor standings are considered, pupils who are a few months older at time of entrance have an advantage.

CHAPTER VI

EFFECT OF ENTRANCE AGE ON PERSONALITY DEVELOPMENT

Learning ability is not predictable solely in terms of similarity in intelligence and rate of maturation. Differences in achievement can, in many cases, be attributed to the personality of the learner.

Children of widely varied backgrounds are expected to make adjustments to entirely new situations when they enter school. The rate and direction of this adjustment will depend to a large extent upon the chronological and mental age of the entrants. Children too immature to cope with the strains and tensions necessarily encountered in day-to-day school situations may have difficulty in developing desirable personality traits. Those who are older chronologically or mentally than the average at time of entrance may find a lack of challenge and thus develop undesirable personality traits. While it is recognized that personality is one of the most subjective phases of pupil development which the school endeavours to measure, nevertheless, the school must be cognizant of the effect of personality development upon pupil progress and achievement.

The Edmonton Public School System has endeavored to evaluate and record on the cumulative records the personality development of each child at the end of each term on the

following six traits:

1. Emotional Control

The child who is developing in emotional control will accept criticism cheerfully and use it to improve himself. He will develop powers of self-direction and control over his emotions. He will accept and respect authority or direction and abide by group decisions.

2. Creativeness

It is that attitude of expressing or constructing in one's unique way what one feels, thinks, or sees. It is akin to originality.

3. Judgment

This implies the development of open-mindedness. In developing this attitude the child will learn to observe and experiment, to use knowledge gained from previous experience, to weigh evidence and to form and test conclusions.

4. Co-operation

The ability to share ideas and possessions with others. The ability to work with groups willingly either as a leader or co-worker.

5. Dependability

A child who is developing a sense of responsibility

will be sincere, trustworthy and dependable. He will be aware of the obligations of a promise and will learn to accept the consequences of his actions.

6. Courtesy (Social Concern)

A child who is developing social concern shows consideration for the rights and feelings of others, is thoughtful and polite.

The rating of these traits is done on a 4-point scale. The instructions given to teachers state that: "1" - "Very Good" will be awarded infrequently and only in those cases where behavior is well above average. The average pupil will rate "2" - "Good"; a smaller number will rate "3" - "Fair"; and only a few poorly adjusted pupils would ordinarily need to be rated "4" - "Poor".

The purpose here was to determine the effect of age at time of entrance on the personality development by comparing the ratings given for:

1. Pupils in Groups 1 and 4 who made normal progress during the first six grades.
2. Pupils in Groups 1 and 4 who were retarded one or more years during the first six grades.
3. Pupils in these two groups at the grade I level and again at the grade VI level to determine whether or not the younger entrants were able

to maintain the same rate of adjustment as the older entrants.

In computing the percentage for each rating given for the six personality traits, the following procedures were used for all the Tables in this section of the study:

1. A count was made to determine the total number of times each of the four ratings was given for each trait for six years.
2. The number of times each rating was given for each trait was totalled for each group and mental age section.
3. The percentage for each rating for each trait was found by dividing the number of times a rating was given by the total number of times the ratings were given for each trait and multiplying the quotient by 100.
4. The percentage for each rating for the six traits was computed by dividing the total number of times each rating was given by the total number of ratings given and multiplying the quotient by 100.

1. Personality Development of Pupils Making Normal Progress.

The personality ratings given for pupils making normal progress in Group 1, the youngest entrants and

Group 4, entrants who were nine months older at time of entrance, were compared in order to determine what effect, if any, age at time of entrance had on personality development during the first six years of school.

The number of times each rating was given for each trait for the mental age sections of pupils in Groups 1 and 4 are expressed in Table XXIII.

TABLE XXIII

RATINGS OF PERSONALITY TRAITS
EXPRESSED IN PERCENTAGES

Personality Traits	C.A. Group 1				C.A. Group 4			
	N 113				149			
	Ratings				Ratings			
	1	2	3	4	1	2	3	4
Emotional Control								
Section A#	26	64	10		28	68	4	
Section B	42	54	4		35	55	9	1
Section C	52	42	6		47	50	3	
Creativeness								
Section A	17	76	7		11	71	18	
Section B	29	65	6		30	60	10	
Section C	31	64	5		45	51	4	
Judgment								
Section A	15	71	14		15	68	16	1
Section B	31	62	7		35	55	10	
Section C	38	54	8		44	52	4	
Co-operation								
Section A	40	51	8	1	40	52	8	
Section B	53	44	3		50	44	6	
Section C	61	30	7		67	30	3	
Dependability								
Section A	34	54	11	1	32	58	9	1
Section B	51	46	3		52	40	8	
Section C	64	26	9	1	64	33	8	
Courtesy								
Section A	42	56	2		46	53	1	
Section B	57	40	3		54	38	8	
Section C	66	32	1	1	66	32	2	
Per Cent	43	52	5	-	47	47	6	-

Mental Age Section A - up to 6 yr. 3 mo.
B - 6 yr. 4 mo. to 7 yr. 3 mo.
C - 7 yr. 4 mo. and over

The variations between chronological age Groups 1 and 4, in the number of "1" ratings given for each trait does not exceed 6 per cent except in the trait Creativeness, where the older entrants were 9 per cent higher. When the percentages for all six traits are considered the younger entrants received 4 per cent less "1" ratings than the older entrants. This may be an indication of immaturity. However, when the number of "2" ratings are considered the younger entrants received 5 per cent more than the older entrants and the two groups are about even when the "3" ratings are considered. It would seem that chronological age at time of entrance has only a very slight effect upon personality development of pupils as evaluated in the Edmonton Elementary Public School System.

The differences are much greater between the mental age sections. For the trait, Emotional Control, pupils in Section A received 26 per cent "1" ratings, Section B, 42 per cent, Section C, 52 per cent. These differences between mental age sections are approximately the same for the six personality traits. The same trend in differences is evident for both groups. The implication is that pupils with higher mental ability have developed to a higher degree their personality traits than pupils with lower mental ability.

Is this a valid assumption or is the difference due to methods of rating the personality traits of pupils? Are the persons responsible for giving these ratings influenced by the higher attainments reached by the brighter pupils? Witmer and Kotinsky[47] point out that there is a very close relationship between the rate of intellectual development and the rate of personality development. "Sometimes intellectual status has been seen as a resultant of the forces exerted by other "parts" of the personality: It was observed that the child's capacity to learn was crippled if he was emotionally disturbed or short on the kind of social experience that would provide intellectual stimulation. The parts remained, though to a degree mutually interdependent."

2. Personality Ratings of Retarded Pupils

In order to determine the effect of age at time of entrance upon the personality development of the retarded pupils in Groups 1 and 4 the percentages of ratings for personality traits are presented in Table XXIV.

TABLE XXIV

RATINGS OF PERSONALITY TRAITS FOR RETARDED PUPILS EXPRESSED IN PERCENTAGES

Personality Traits	C.A. Group 1				C.A. Group 4			
	N 113				149			
	Ratings				Ratings			
	1	2	3	4	1	2	3	4
Emotional Control	23	55	18	4	15	70	12	3
Creativeness	10	68	15	6	3	67	29	1
Judgment	5	66	20	8	2	67	30	1
Co-operation	22	60	12	8	33	55	12	-
Dependability	14	56	24	6	24	50	24	2
Courtesy	31	47	20	3	52	38	10	-
Per Cents	19	59	18	4	20	58	19	3

The figures in Table XXIV indicate that in Group 1, 19 per cent of the ratings given for all the traits were "1's", 59 per cent were "2's", 18 per cent were "3's", and 4 per cent were "4's". Group 4 received approximately the same percentages. It would seem that age at time of entrance has very little effect on the personality development of retarded pupils.

A summary of the figures given in Table XXIII and Table XXIV is presented in Table XXV in order to compare the percentage of ratings given for the personality traits of the pupils in Groups 1 and 4 making normal progress with pupils in the same groups who were retarded.

TABLE XXV

COMPARISON OF PERCENTAGES OF PERSONALITY RATINGS OF PUPILS MAKING NORMAL PROGRESS WITH RETARDED PUPILS

	Group 1				Group 4			
	Ratings				Ratings			
	1	2	3	4	1	2	3	4
Normal	43	52	5	-	47	47	6	-
Retarded	19	59	18	4	20	58	19	3

Figures in Table XXV indicate that pupils making normal progress received 43 per cent "1" ratings, as compared with 19 per cent for the retarded pupils. The differences are approximately the same for both groups. This would seem to point out the fact that there is a very close relationship between personality development and pupil progress. On the other hand, non-promotion may be the cause of the lower personality ratings of these pupils.

It was not possible from the data used in this study to determine to what extent the progress of pupils was influenced by their personality development. Cook[48] contends that non-promotion does not necessarily help to develop better personality and social adjustment, since causing pupils to remain in groups where they become chronologically older than the average age for the group presents as many problems to the pupils as when they are put in groups where they find it difficult to achieve.

3. Personality Ratings at Grade I and VI Levels

By comparing the ratings of the personality traits of the younger entrants with the older entrants at the grade I level and again at the grade six level, it may be possible to determine whether or not the younger entrants were able to maintain the same rate of adjustment as the older entrants.

The percentage for each rating for each trait for Group 1 at the Grade I and VI level are shown in Table XXVI.

TABLE XXVI

RATINGS OF PERSONALITY TRAITS
EXPRESSED IN PERCENTAGES
AT THE GRADE I AND VI LEVEL, GROUP 1

Personality Traits	C.A. Group 1 Grade I				C.A. Group 1 Grade VI			
	N 113				113			
	Ratings				Ratings			
	1	2	3	4	1	2	3	4
Emotional Control	46	46	8	0	49	45	6	0
Creativeness	36	57	7	0	31	61	8	0
Judgment	30	60	9	1	36	54	10	0
Co-operation	54	42	4	0	60	35	5	0
Dependability	47	50	3	0	60	33	7	0
Courtesy	51	46	3	0	63	30	7	0
Per Cent	44	50	6	0	50	43	7	0

Table XXVI reveals that pupils in Group 1 at the grade I level received 44 per cent "1" ratings and at the grade VI level received 50 per cent "1" ratings.

Table XXVII shows the percentage of each ratings for the six personality traits given to pupils in Group 4 at the grade I and VI levels.

TABLE XXVII

RATINGS OF PERSONALITY TRAITS EXPRESSED IN PERCENTAGES AT GRADE I AND VI LEVEL, GROUP 4

Personality Traits	C.A. Group 4 Grade I				C.A. Group 4 Grade VI			
	N 149				149			
	Ratings				Ratings			
	1	2	3	4	1	2	3	4
Emotional Control	42	47	10	1	41	54	5	0
Creativeness	34	55	10	1	30	57	13	0
Judgment	24	70	6	0	41	50	9	0
Co-operation	45	49	6	0	63	33	4	0
Dependability	40	40	9	1	56	39	5	0
Courtesy	50	44	6	0	65	32	3	0
Per Cent	40	52	8	0	50	44	6	0

Figures in Table XXVII indicate that pupils in Group 4 were given 10 per cent less "1" ratings at the grade I level than the same pupils at the grade VI level.

Should there be this difference in personality ratings at the grade I and VI level? The purpose of ratings pupils is to give some indication or measure of personality development at each age and grade level and should be based on normal development for that particular level. Possibly more consideration should be given to the standard of personality development expected at each grade level, in order that the ratings of a normal group of pupils would remain about the same throughout the six grades.

While figures in Table XXVI and XXVII indicate that there is a difference between the personality ratings given at the grade I and grade VI level, there is very little difference between the chronological age groups. The younger entrants were able to maintain the same rate of adjustment as the older entrants.

SUMMARY OF FINDINGS

1. There is no evidence that age at time of entrance has any effect upon the personality development of children as rated by methods used in the Edmonton Elementary Public Schools.
2. Pupils in the higher mental age sections receive substantially higher ratings than pupils in the lower mental age sections.
3. Pupils in chronological age Groups 1 and 4 receive higher personality ratings in grade VI than they do in grade I.

CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS

The purpose of the study was to determine, from the data obtained, the effect of age at time of entrance into grade I upon subsequent achievement of pupils in the Edmonton Elementary Public Schools by comparing:

1. The standardized achievement test scores, grade six final marks, regularity of attendance, and intelligence test scores of groups of pupils who were under six years of age at time of entrance with groups of pupils who were over six years of age at time of entrance.
2. The number of retardations, recommendations (conditional promotions), honor standings, and accelerations of the younger entrants with with older entrants.
3. The social development of the younger entrants with the older entrants as evaluated by ratings given for six personality traits.

The examination and consideration of the data used in this study have led to the following conclusions:

1. Effect of Chronological Age on Subsequent Achievement

A comparison of the means of the grade scores of the seven standardized achievement tests indicate that there is no appreciable difference in achievement between

the underage entrants and normal age entrants, but the overage entrants have scores which are consistently lower. The lower scores received by the overage entrants may be due to the lower mental ability of pupils in this group.

Furthermore, statistical analyses of the differences in means obtained from standardized achievement tests given at the grade II, IV and VI levels indicate that there is no significant difference in average achievement between the underage entrants and the normal age entrants.

While it has been demonstrated that the achievement of the two groups is comparable, an examination of the intelligence scores shows that the underage entrants have higher mental abilities than the normal age entrants. Therefore, it may be expected that the younger pupils should have a higher standard of achievement. The inability of the underage entrants to reach higher standards may be attributed to the fact that these pupils are a little younger and are not physically mature enough to reach levels of attainment commensurate with their mental abilities. This failure to reach higher levels of achievement is also evident with respect to the number of honor standings, where it is found that the normal age entrants received more honor standings than the underage entrants.

The findings with respect to the pupil progress show that the number of retardations and recommendations is approximately the same for each chronological age group. Since the findings with respect to achievement and pupil progress reveal the same results, it may be concluded that chronological age as specified in the entrance regulations has no effect on subsequent achievement.

The comparison of the final grade VI marks, for the seven subjects considered, indicates that there is no difference in marks obtained by the underage entrants and the normal age entrants. The overage entrants received marks which were 7 per cent lower than those obtained by the underage entrants.

There is no substantial difference in the ratings given for the personality traits between the younger entrants and the older entrants. It then may be concluded that chronological age at time of entrance has very little effect upon the personality development of pupils in the Edmonton Elementary Public Schools.

There was found to be no difference in the regularity of attendance of the chronological age groups.

Therefore, it may be concluded with confidence that there is no apparent difference in achievement, pupil progress, personality development or attendance between the underage and normal age entrants. It is,

however, shown that the overage entrants are not able to reach the standard of achievement attained by the other two groups.

2. Effect of Mental Age on Subsequent Achievement

The results of a statistical analysis of standardized achievement tests given at the grade II, IV and VI levels indicate that there is a significant difference in achievement between the mental age sections. There was also found to be a substantial difference in the final grade six marks between the mental age sections. The largest number of retardations and recommendations were in the lowest mental age section and a greater percentage of honor standings and accelerations were in the highest mental age section.

The pupils in the highest mental age section received substantially higher personality ratings than pupils in the lowest mental age section. This suggests that there is a relationship between mental ability and personality development. However, the fact that the brighter pupils receive higher ratings on personality traits may be the result of teachers being influenced, when evaluating personality development, by the higher standards of achievement of the brighter pupils.

The ratings of personality traits received by retarded pupils were considerably lower than the ratings received by pupils making normal progress. This would seem to imply that personality development is a factor causing retardation.

There is no difference in the regularity of attendance among the mental age sections. Therefore, attendance is not a factor causing differences in achievement or pupil progress in the mental age sections.

The overage pupils, most of whom were kept out of school one year because they were below the 5-9 mental age requirement, were not able to achieve as well as the underage entrants. Therefore it would be reasonable to assume that if the overage entrants had entered school a year earlier they would not have been able to make normal progress, thus increasing the instructional burden of teachers.

The results of this investigation point out very definitely that mental age at time of entrance is a factor causing differences in achievement, pupil progress and personality development of pupils in the Edmonton Elementary Public Schools.

The findings of this study do not agree with those of King[49] who found that pupils who are a few months older chronologically at time of entrance attain

a higher level of achievement, attend more regularly and are better socially adjusted than younger entrants. However, the findings of this study do agree with the findings of Handy[50] who states that differences in chronological age at time of entrance do not seem to be a factor causing low achievement and pupil failure, but that the determining factor in subsequent achievement is the mental age at time of entrance.

This investigation clearly indicates that a combination of chronological and mental age is desirable in the entrance regulations. The chronological age regulation is necessary since some children with low mental ability would not be able to enter until they were seven or eight years of age, if mental ability were the sole criterion. The minimum mental age requirement is necessary unless a more adequate differentiated program is provided to meet the wide range of abilities encountered in the primary grades.

RECOMMENDATIONS

From the data considered in this study and the conclusions derived, the following recommendations are presented for further consideration.

1. The findings of this study indicate that achievement and pupil progress depend very largely upon mental age at time of entrance. Therefore, it seems apparent that a mental age requirement is necessary in the entrance regulations. Since there is no conclusive evidence in this investigation that a mental age requirement of 5-9 is too low or too high, a further study is necessary to determine the most appropriate mental age to set as part of the entrance requirements. However, the findings seem to suggest that the entrance requirements of the Edmonton Public School System should be continued without change until further evidence is compiled which would prove its inadequacy.

2. The data considered in this study indicate that the underage entrants have higher mental abilities and equal or higher achievement scores than the normal age entrants but they do not receive as many honor standings as the normal age entrants. A further investigation seems necessary to determine reasons for this discrepancy.

3. It has been conclusively shown that mental age at time of entrance is a factor causing differences in achievement and pupil progress. Therefore, it is apparent that in order to cope adequately with the wide range of abilities found among pupils in the elementary school there must be more emphasis placed on expanding and improving the differentiated program now offered.

4. Since the ratings of the personality traits of the retarded pupils are considerably lower than those making normal progress, it seems that further study should be carried out to determine what effect personality development at time of entrance has upon the subsequent progress of pupils. It may be that too much reliance is being placed upon intelligence tests and not enough consideration is being given to the social adjustments of the entrants.

5. This investigation reveals that pupils with high mental ability received higher ratings on personality traits. A further investigation is needed to determine the reliability of the methods used in rating the personality traits. It seems desirable that rating methods which are more objective in nature should be introduced in order to eliminate as far as possible the chances of teachers being influenced by the higher achievement of brighter pupils.

6. There was found to be a very definite lack of information on the cumulative records explaining the reasons for low achievement and retardation. In most cases where a pupil with average ability was retarded one or more years insufficient reasons were given as to why the pupil did not make normal progress. No standardized test results are recorded on the cumulative records for grades III and V. If the results of more standardized tests, especially in Arithmetic and Language, were recorded on the cumulative records, a more comprehensive understanding of a pupil's weaknesses would be readily available.

7. Finally, it is recommended that a further study be undertaken to determine whether or not the sex of a pupil is a factor causing difference in achievement between underage and normal age entrants.

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APPENDIX A

No.	Date of Birth											Date of Entry	
	CA	MA	IQ	Character						Attend.	Pr.		
Detroit				1	2	3	4	5	6	1			Oral R.
Laycock										2			Silent R.
	Gr.	F	R							3			Literature
Gates W.										4			Oral L.
Gates P.										5			Written L.
Sp. Ab.										6			Spelling
Word M.													Accuracy
Unit Sc.													Problems
Sp. Ab.													Writing
Unit Sc.													
Others													Average